PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

23 SEP 2004

Applicant's or agent's file reference PE537	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/IB 03/01233	International filing date *(day/month/year)* 28.03.2003	Priority date *(day/month/year)* 29.03.2002
International Patent Classification (IPC) or both national classification and IPC F04C2/10, F04C2/10		
Applicant CPS COLOR EQUIPMENT S.P.A.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
13.10.2003	24.03.2004
Name and mailing address of the international preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Lequeux, F Telephone No. +31 70 340-4664

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/IB 03/01233

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1-4 as originally filed

Claims, Numbers

1-7 received on 16.02.2004 with letter of 16.02.2004

Drawings, Sheets

1/1 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).

   ☐ the language of publication of the international application (under Rule 48.3(b)).

   ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   ☐ contained in the international application in written form.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority in written form.

   ☐ furnished subsequently to this Authority in computer readable form.

   ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   ☐ the description, pages:

   ☐ the claims, Nos.:

   ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-7
	No:	Claims	
Inventive step (IS)	Yes:	Claims	5-7
	No:	Claims	1-4
Industrial applicability (IA)	Yes:	Claims	1-7
	No:	Claims	

2. Citations and explanations

   see separate sheet

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:
D1: FR-A-2 562 959 (HYDRO FLUID) 18 October 1985 (1985-10-18)
D2: US-A-6 062 836 (JUELICHER WILHELM ET AL) 16 May 2000 (2000-05-16)

1. The document D1 discloses (the references in parentheses applying to this document):
an internal gear pump (fig 1 and 2) with all the features of the preamble of claim 1 and also wherein the outer rotatable element is provided with a plurality (page 3, line 34) of radial grooves (21) on its radial outer surface (17) at the location of the centring wall of the housing (2).

The subject-matter of independent claim 1 differs therefore in that the surface of the centring walls of at least one of the rotatable element is provided with undercut regions being elongated in the direction of an axis of rotation of at least one rotatable element about the corresponding centring body.

Hence the subject-matter of claims 1-7 is new (Article 33(2) PCT).

a. The problem to be solved by the present invention may be regarded as to avoid the jamming due to deposits of the rotatable element on its centring body.

b. However these features have already been employed for the same purpose in a gear pump, see document D2 (Fig 1 and column 1, line 63 - column 2, line 3). It would be obvious to the person skilled in the art, namely when the same result (column 1, lines 4-8 and 36-38) is to be achieved, to apply these features with corresponding effect to a pump according to document D1, thereby arriving at a pump according to claim 1. The choice of a specific orientation of the undercut regions (in this particular case being "elongated in the direction of an axis of rotation") has been disclosed in D2 (column 2, lines 4-11). The specific location (in the case of claim 1 at the location of the centring walls) of the undercut portions is merely one of several straightforward "jammed interfaces"-possibilities from which the skilled person would select, in accordance with circumstances (see also page 1, line 30 to page 2, line 3 of the description of the present application), without the exercise of inventive skill.

The subject-matter of claim 1 does therefore not involve an inventive step (Article 33(3) PCT).

2. Dependent claims 2-4 do not contain any additional features with regard to documents D1 and D2 which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of an inventive step (Article 33(3) PCT).

3. The combination of the features of claims 5-7 would neither be known from, nor be rendered obvious by, the available prior art. Hence the subject-matter of claims 5-7 is inventive (Article 33(3) PCT) .

4. The subject-matter of claims 1-7 is industrially applicable (Article 33(4) PCT).

CLAIMS

1. A positive-displacement pump, in particular for use in machines for dispensing fluids, comprising two elements that are rotatable with respect to one another and which mesh with one another (20, 30), each rotatable element being rotatably mounted in the pump with centred coupling without interference with a corresponding centring body (18, 11a), characterised in that at least one of the two rotatable elements has a plurality of undercut regions (26, 34, 35, 36) at the location of the centring walls, the undercut regions (26, 34, 35, 36) comprising a wall portion which is spaced with respect to the facing wall of the respective centring body, the undercut regions (26, 34, 35, 36) being elongated in the direction of an axis of rotation of the at least one rotatable element (20, 30) about the corresponding centring body (18, 11a).

2. A positive-displacement pump according to claim 1, characterised in that it comprises at least one gear or sprocket (20) mounted rotatably on a pin (18), the central opening of the sprocket (20) comprising portions of centring wall (23) which define the centred coupling of the sprocket 20 to the pin (18) and which alternate with portions of undercut wall (26) spaced from the pin (18).

3. A positive-displacement pump according to claim 2, characterised in that it comprises three portions of centring wall (23).

4. A positive-displacement pump according to claim 1, characterised in that it comprises at least one gear or rotor (30) mounted rotatably inside a cylindrical cavity (11a) and having a peripheral curved surface (31) for defining the centred coupling of the rotor (30) to the

cylindrical cavity (11a), portions of undercut wall or depressions (34, 35, 36) spaced from the cylindrical cavity (11a) being provided on the peripheral curved surface (31).

5. A positive-displacement pump according to claim 4, characterised in that peripheral notches (32) are provided on the cylindrical peripheral curved surface (31) of the rotor (30) and define a plurality of peripheral teeth (33), at least some depressions (34) being provided on the outer face of each peripheral tooth (33), between two adjacent peripheral notches (32).

6. A positive-displacement pump according to claim 5, characterised in that at least second depressions (36) are provided on the cylindrical peripheral curved surface (31) of the rotor, in a position aligned longitudinally with the peripheral notches (32).

7. A positive-displacement pump according to claim 5, characterised in that it comprises an annular depression or chamfer (35) on a portion of the peripheral curved surface (31) remote from the peripheral teeth (33).